



# MARSHALL STAR

Serving the Marshall Space Flight Center Community

May 1, 2008

## Web tool enhances airborne Arctic science mission



Marshall research scientist Richard Blakeslee, a developer of the Real Time Mission Monitor, performs a preflight system checkout on board the DC-8.

*By Jennifer Morcone and Dauna Coulter*

**W**hat if you were embarking on a road trip and you had an on board tool, complete with video screen, that let you view your projected route, real-time traffic information and current weather, at any time during the journey? Not only that, but friends and family anywhere else in the world could follow your progress on a home computer. Sound good?

NASA scientists flying over the Arctic on the largest airborne experiment ever to study the role of air pollution in that region had such a tool at their disposal. The Real Time Mission Monitor, developed by Marshall Center researchers, assembles the data from all the research satellites, aircraft and surface sensors and displays the "big picture," overlaid on Google Earth, for the whole team of scientists to view at the same time anywhere during the live mission.

Scientists hard at work on the NASA Arctic Research of the Composition of the Troposphere from Aircraft and Satellites mission, or ARCTAS, want to know why the Arctic environment has been rapidly changing. From vantage points aboard NASA aircraft, they study the dynamics and effects of pollution transported to and around the region. Information gathered from the aircraft will help validate critical NASA satellite data and provide clues about phenomena like the recent decline of Arctic sea ice.

"For this experiment, having current information on where clouds and pollution

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## University Student Launch Initiative announces early winners

Though the grand prize winner in the 2007-2008 University Student Launch Initiative will not be named until late May, judges from the Marshall Center and event sponsor ATK Launch Systems have announced a number of category winners in the April 19 rocketeering competition.

NASA's annual University Student Launch Initiative — and its sister program, the Student Launch Initiative for middle school

*See Winners on page 6*

## ***NASA to test space shuttle reusable solid rocket motor in Utah on May 1***

NASA will conduct a two-minute static, or stationary, firing of a space shuttle reusable solid rocket motor May 1 at a Utah test facility.

The primary objective is to evaluate possible performance changes of aged shuttle reusable solid rocket motors. The test also will provide data for the Ares I crew launch vehicle and NASA's future exploration goals to return humans to the moon.

Read more about the test in next week's Marshall Star.

# THE FACE OF MISSION SUCCESS IS: Steve Harvison

## *Ullage settling motor design lead in the Solid & Hybrid Propulsion Systems Branch*

Just how would one go about creating artificial gravity? Ask Steve Harvison, ullage settling motor design lead in the Solid & Hybrid Propulsion Systems Branch in the Engineering Directorate. He and his team take designing motors to a whole new level — artificially.

### **What is your education background?**

I graduated from the University of Tennessee in Knoxville in 1982 with a bachelor's degree in mechanical engineering with an aerospace option. The option classes were in propulsion, including solid and liquid rocket engine courses. This interest in propulsion led me to my first job with Thiokol Propulsion Tactical Division in Huntsville, beginning my career in solid rockets.

### **What are the key responsibilities of your position?**

I lead our team on the design and development of the Ares I solid propellant rocket motor that will provide artificial gravity to the upper stage during separation. This new solid rocket motor is called the ullage settling motor. The design is similar to a booster separation motor used on the space shuttle's reusable solid rocket motor, smaller in diameter and about twice as long. These eight motors are attached to the upper stage aft skirt in four pairs. The ullage settling motor will provide the necessary artificial gravity for the Ares I J-2X engine during the separation of the two stages, so that propellants remain in the lower part of the hydrogen and oxygen tanks and properly flow into the engine.

The team, which has a diverse group of engineers, chemists and analysts, is a great high performance group. As the team's technical lead, I assign various tasks to personnel within our integrated product team, ensuring our efforts are focused in the right direction. I also lead the design trades to be conducted on the ullage settling motor versus the vehicle requirements, and any changes that may arise during the development phase. For instance, we just went through a major design change requiring the settling motor burn time increase from three to four seconds. We are coordinating our internal design and development activities with other departments to make sure the appropriate analyses are conducted on each aspect of the new design. In addition we coordinate with the Boeing Company, our upper stage production

contractor, to ensure that the design we bring forward is cost effective and producible.

### **What services does your job provide in support of the center's mission and NASA's goal of exploration?**

We provide technical excellence in the design and development of the new ullage settling motor from the ground up. We make sure we meet all Ares functional requirements imposed on the settling motor while writing the necessary specifications to define this system. In support of the mission, we also prepare the technical drawings and reports in support of the upper stage Design and Analysis Cycles,

which are the phases of hardware development that increase in fidelity as the design progresses.

NASA and the Marshall Center have not led a new design of a solid rocket motor for quite some time, so this is a great opportunity for us. Several team members are fresh out of college and are eager for this challenge. This is a wonderful training opportunity for them. We are getting the chance to work on every aspect of solid rocket motors such as the propellant tailoring work, technical analyses, modeling

and simulations, and hands-on development testing. Some of the engineers are actually helping mix propellant. This kind of thing doesn't come around every day. Several of us experienced team members have been looking forward to this project for a long time.

### **What do you hope to accomplish in your role this year?**

This year, my team and I hope to complete the preliminary design of the ullage settling motor, while supporting the Upper Stage Preliminary Design Review currently planned for June. We also hope to conduct the first heavy-weight motor solid rocket test here at the center to evaluate the ullage settling motor design and verify our engineering models. The heavy weight motor is a test article that hasn't been optimized for flight but still performs like the flight motor. This test is planned for the end of May. Three additional tests are planned for late this year and into 2009.

In support of this testing, we will complete initial propellant tailoring for a solid propellant suitable for use in the design. In a cooperative effort with the Army propulsion lab, Aviation & Missile

*See Harvison on page 3*



Steve Harvison

# Marshall's Small Business Office oversees signing of NASA Mentor-Protégé Agreement

In March, the Marshall Center's Small Business Office oversaw a "Mentor-Protégé" signing agreement between The Boeing Company and Orion Propulsion Inc., both of Huntsville.

The one-year pact marked NASA's first such agreement under the new NASA Mentor-Protégé Program, implemented in January 2008. It focuses on joint development work by the two companies on NASA's Ares I rocket, which will begin transporting astronauts to space in coming years for exploration missions to the moon and beyond.

NASA's Mentor-Protégé Program pairs large companies with eligible small businesses to enhance their capabilities and enable them to successfully compete for larger, more complex prime contract and subcontract awards. Agreements can range up to three years in length.

The Huntsville-based Boeing office, part of Boeing Integrated Defense Systems of St. Louis, Mo., is under contract to NASA to produce the Ares I upper stage fuel tank and avionics ring. Boeing will build the upper stage at NASA's Michoud Assembly Facility in New Orleans in late 2009.

Orion Propulsion is a small, woman-owned aerospace company that provides propulsion engineering, testing, verification and production expertise to NASA and other government and industry agencies and organizations. Orion Propulsion currently supports Boeing on the development of the Ares I reaction control system, which includes small rocket engines and subsystems that control Ares' orientation during its ascent to orbit.

Boeing will aid Orion with internal training related to propulsion system processes and activities associated with production of the reaction control system said Ray Robin, a supplier management official in Boeing's Exploration Launch Systems group. Boeing also will aid the small company with business development, human resources and supply chain management.

Tim Pickens, chief executive officer at Orion Propulsion, said the agreement makes his company a more cost-effective and viable



David Higginbotham/MSC

Participating in the NASA Mentor-Protégé Agreement signing March 28 between The Boeing Company and Orion Propulsion Inc. are, seated from left, Jim Chilton, vice president of Boeing Exploration Launch Systems; Tim Pickens, chief executive officer of Orion Propulsion; and Steve Morris, Marshall contract specialist in the Office of Procurement's Space Transportation Support Office. Observing the signing, from left, are Ray Robbins, manager of supplier management for Boeing's Huntsville offices; Becky Martin, manager of supplier diversity for Boeing; Fred Bickley, the contracting officer's technical representative for the Ares Projects upper stage; Danny Davis, manager of the Ares I upper stage element; Byron Butler, deputy director of Marshall's Office of Procurement; Steve Cook, manager of Ares Projects at Marshall; and David Brock, small business specialist in Marshall's Small Business Office.

subcontractor to NASA and other aerospace customers – and according to Marshall Small Business Specialist David Brock, that's the whole purpose of the Mentor-Protégé Program.

"The program is intended to encourage our larger partners and contract companies to support the industry as a whole by teaming with new or small businesses," Brock said, "The arrangement benefits both — it fosters long-term relationships between the two companies and with the NASA programs and missions they support.

"And it boosts the success of the aerospace industry as a whole, helping more small businesses gain a foothold, creating new jobs and enabling more companies to viably compete for NASA contract and subcontract awards that will enable the agency to continue its critical work on behalf of the nation."

The Mentor-Protégé Program was created by NASA's Office of Small Business Programs. For more information, visit <http://osbp.nasa.gov/mentor.html>.

## Harvison

### Continued from page 2

Research, Development & Engineering Center, we are conducting testing of ballistic, mechanical and processing properties on propellant mixes made here on Redstone Arsenal. With our oversight and the Army's facilities and personnel, this effort is a success.

In addition to our heavy-weight motor test, several development tests are being conducted on the new ullage settling motor igniter design, which is also a new design. It's a smaller solid motor that ignites the larger settling motor.

### Away from work, how do you like to spend your personal time?

Boating and water skiing with family and friends are ways I like to spend time away from work. I bought a boat when I moved to Huntsville and have enjoyed every season. Recently, I purchased a bike and I look forward to riding it on the weekends. I enjoy spending time out on the softball field with my daughter Stephanie, who will be graduating from Huntsville's Grissom High School this year. She is a pitcher on a softball team so for several years, I have enjoyed serving as her catcher and coach.

Jessica Wallace, an ASRI employee and Marshall Star editor in the Office of Strategic Analysis & Communications, contributed to this article.



## Web tool

### *Continued from page 1*

plumes are occurring in the atmosphere can greatly improve science measurements," says senior research scientist Richard Blakeslee of the Marshall Center, a developer of the Real Time Mission Monitor. "Because the monitor combines displays of the positions and tracks of all the mission aircraft with near-real-time satellite imagery, model forecasts of aerosols and pollution, and research satellite overpass predictions, it helps the science team make urgent decisions about where exactly to fly to get the best measurements."

The integration and delivery of this kind of information is made possible through data acquisition systems, network communication links and network server resources developed and managed by researchers at the National Space Science and Technology Center in Huntsville, and NASA's Dryden Flight Research Center in Edwards, Calif.

"The Real Time Mission Monitor was very useful last week when high winds caused the DC-8 flight to divert from Thule, Greenland, to Iqaluit, Canada," said James Crawford, ARCTAS program manager. "At first, the primary concern of the pilots was getting to Iqaluit. However, the ability to monitor the situation allowed the mission planners time to re-consult satellite observations and model forecasts, leading to the decision to direct the DC-8 toward a hotspot of bromine radicals, a chemical associated with ozone depletion, observed by NASA's Aura satellite. A low pass with the aircraft over the area of interest was possible before landing in the new location."

The network also is enhancing mission operations in other ways. In addition to the Real Time Mission Monitor display, scientists and mission managers anywhere on the ground or in the air can communicate using an integrated instant messaging and voice communication service linked to the monitor.

"The value of network communications for airborne science operations cannot be underestimated," says Larry Freuding, Dryden project lead for developing system components that provide communication and computing services between the aircraft and

the ground. "The Real Time Mission Monitor gives the researcher intuitive, browsable views into a distributed web of dynamic data sources and processing components. The network is the instrument by which collective observations morph into timely decisions that improve productivity."

The network starts with gateways that use the Iridium satellite constellation to enable anywhere, anytime connectivity with each aircraft, which has multiple satellite links for improved bandwidth and reliability. The ground station at Dryden provides Internet access for the aircraft, while servers at Marshall gather satellite imagery, weather and atmospheric chemistry forecast models and any other elements needed for the ARCTAS Real Time Mission Monitor. Each airplane similarly has a set of servers to support data management, communication and applications used by on board instrument teams.

The ARCTAS campaign provides the third and most complex test-drive for the monitor. The Web-based system was first tested in 2006 to help look for clues about conditions that foster hurricane development off the coast of Africa. Last year, the monitor got another shakedown during NASA's airborne mission studying tropical weather conditions over Costa Rica.

The mission includes two aircraft deployments, each three weeks in duration, in spring and summer 2008. The ARCTAS spring deployment, which ended April 20 in Fairbanks, Alaska, gathered critical information about the effects of arctic haze, stratosphere-troposphere exchange and sunrise photochemistry.

The summer deployment, scheduled for June 26 to July 14 in Cold Lake, Alberta, will investigate how local emissions from northern forest wildfires affect the composition of the arctic atmosphere. The Real Time Mission Monitor will take advantage of feedback from scientists who used the tool during the spring campaign and be back at it this summer helping the ARCTAS science team gather the best possible information.

*Morcone is a member of the Public & Employee Communications Office in the Office of Strategic Analysis & Communications. Coulter, a Schafer employee, supports the Office of Strategic Analysis & Communications.*

## This month in history ...

NASA is fast approaching its 50th anniversary on Oct. 1. In addition, the Marshall Center will mark its own 50th anniversary in 2010. NASA formed the Marshall Center in 1960, and only a few months after its founding, the new field center began issuing its own newspaper, the Marshall Star.

To mark NASA's anniversary and to promote awareness of the center's own upcoming 50th anniversary, Inside Marshall will be posting a vintage edition of the Marshall Star each Thursday. To read a copy of the first edition of the newspaper dated Sept. 28, 1960, go to [http://inside.msfc.nasa.gov/announcements/star\\_50-1.html](http://inside.msfc.nasa.gov/announcements/star_50-1.html). That edition includes stories about plans to publish the Marshall Star each week, about the center's first director, Dr. Wernher von Braun, and plans by the University of Alabama to establish a science research institute in Huntsville.





## Participants dig Earth Day events

From left, Marshall Center Director David King; John Malone, morning radio show host on Lite 96.9 FM; and Madison Mayor Sandy Kirkindall dig in to Earth Day festivities April 22 outside Activities Building 4316. They took part in the annual tree-planting ceremony, just one of the many activities that Marshall's Environmental Excellence Team sponsored to inspire awareness of and appreciation for the planet. Other "green" goings-on were an environmental expo, where more than 24 vendors handed out free Earth-friendly information and products to participants, and theatrical performances on energy conservation by the Jones Valley Elementary School Robotic Team. Awards also were presented to photo contest winner Arthur Patrick, logo contest winner Jean Snowden and Environmental Hero Award winner Ashlee Bohr.

Doug Striffler/MSFC

## Marshall to hold Technology Awareness Campaign May 7

All Marshall team members are invited to participate in the Technology Awareness Campaign expo, May 7 from 10 a.m. to 3 p.m. in Activities Building 4316.

Sponsored by Marshall's Office of the Chief Information Officer, the theme of the 2008 Technology Awareness Campaign is "Get Information... Get Connected."

The event spotlights information technology services, products and solutions used across the center. It also will provide information employees can use to better choose, maintain and safeguard their personal technology tools at home and on the road.

Dozens of internal organizations and commercial vendors will be on hand to demonstrate information technology-related services. Experts will offer tips on desktop streaming technologies; Internet safety and customizing software and applications. Tutorials will be offered on HDTV, WIFI access, digital cameras and other home technology tools and devices.

Giveaways will be held throughout the day. Free popcorn will be available all day, and event sponsors will provide ice cream to attendees at 1:30 p.m.

For more information, visit Inside Marshall or call information technology specialist Burt Bright at 544-0334.

## Classified Ads

*To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Employee Ads — Submit Ad." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue, May 8, is 4:30 p.m. Thursday, May 1.*

### Miscellaneous

Valhalla Masonic Garden, four plots, \$4,000 plus transfer. 881-9421  
1.06-carat diamond ring, mounted in four round/four baguette diamonds, appraisal papers, \$2,500. 710-8105  
Sunroof visor for 2006 Honda Civic sedans, \$50. 541-4991  
Sony HT-DDW870 6.1-channel surround sound system, receiver, speakers, remote, \$45 obo. 348-1878  
Cherry wood/metal dinette set, baker's rack, custom table top, \$700. 325-1017

Dell computer, new 5600 CPU, 1Gb RAM, DVD/-RW, GeForce 8300 graphics, warranty, \$345. 417-4828  
Four Windsor dining chairs, stenciled back, \$500 obo; three-piece wicker patio set, \$200 obo. 901-484-6809  
John Deere 870, 28HP, turf tires, 5-foot Woods RM 360 finishing mower. 931-625-1144  
Western saddle, English saddle, \$200 each; numerous old quilts, \$20 up. 426-8059  
Ivory wedding dress, size 6, sewn-in 34C corset, will e-mail pictures, \$500 obo. 615-225-7364  
Hitachi C10LA 10-inch cabinet saw, 1-1/2 HP motor, 3-1/4 HP peak, will help load, \$850. 837-2297  
12-gallon aquariums, stands, everything included, \$150; 15-gallon aquarium, with fish, \$200. 665-2832  
Wedding dress, size 16/18, beaded headpiece, veil, bridal slip, can e-mail pics, \$175. 426-7862  
Table, six chairs, \$150. 728-5768  
Electronic PROFORM 540S Heart-Rate Control Treadmill, space saver design, \$375 obo. 714-0581  
Cressi S104 BCD, small/medium size, black, integrated weight pockets, D rings, \$75. 653-1127  
10-in-one game table, still in box, \$40. 505-3363  
Four burial plots, Tri-Cities Cemetery, Florence, Ala., \$6,500. 890-0575 or 337-9683  
Sears car top carrier, lock, \$100; solid oak corner entertainment center, \$450. 655-2548  
Broyhill kitchen hutch, glass sides, doors, shelves, \$525; wood kitchen table, four chairs, \$375. 975-1667  
Two 1992 E-Z-GO gas golf carts, four seats, extended top, \$1,450 each obo. 682-6326

### Vehicles

2006 Honda 450r four wheeler, \$5,000 obo. 777-4030

2005 Lexus RX330, warranty, 25 MPG, factory chrome rims, black on black, 42,500 miles. 603-3988  
2003 Honda Pilot EX, black, chrome trim package, trailer hitch, 95k miles, \$13,000. 468-3749  
2003 Honda VTX1800 Cruiser, burnt orange, wind guard, side bags, \$7,250. 227-2900 or e-mail alsbox@att.net  
2003 Jeep Cherokee Laredo, 2WD, 58k miles, \$11,500. 655-6701  
2002 Honda XR80 trail bike, helmet, riding gear, \$995. 683-4758  
2001 Chevy Tahoe, V8, pewter, auto doors/windows, \$10,500. 497-4116  
1999 Toyota 4-Runner Limited Edition, white, brown interior, sunroof, CD, A/C, \$7,000. 694-1260  
1995 Toyota 4-Runner, V6, 4X4, black, CD, A/C, cosmetic body damage, rebuilt engine, \$3,500. 655-1733  
1994 Lone Wolf 7- by 16-foot dual axle utility trailer, stowable ramps, spare, \$750. 325-2919  
1983 Datsun 280 ZX, make offer. 468-0686  
18-foot 6-ton trailer, brakes, less than 1 year old, \$2,800. 444-0137  
1981 Chevy El Camino, \$3,000 firm. 423-243-4350

### Wanted

20-30 gallon aquarium, cover, light, guaranteed not to leak. 859-9165  
Claws foot bathtub, new or antique, must be in good shape. 683-5793

### Free

Black Lab puppies, 8 weeks old. 679-2754

## Winners

*Continued from page 1*

and high school students, which concluded April 26 — challenges student teams to build their own rockets, complete with working science payloads, then launch them to an altitude of 1 mile and retrieve them intact. Winners include:

**Best Vehicle Design:** The team from the University of Alabama in Huntsville won the most creative and innovative overall vehicle design award, which focuses on maximizing safety and efficiency of vehicle design to serve the needs of the rocket's intended science payload.

**Best Payload Design:** Utah State University in Logan won the award for the most creative and innovative payload experiment, emphasizing safety and scientific value.

**Project Review Award:** This honor was presented to Utah State University in Logan, for the best combination of written critical design and flight readiness reviews and formal presentations.

**Outreach Award:** Missouri University of Science & Technology in Rolla won the outreach award, for best inspiring the study of rocketry and other science, technology, engineering and math-related topics in local schools and their community.

**Best Web Design:** Auburn University in Auburn, Ala., won the best, most efficient rocketry Web site, completed on time with all relevant documentation.

**"Closest to Altitude" Award:** Vanderbilt University in Nashville won for coming closest to the specified 1-mile altitude goal during the launch event. Vanderbilt's rocket flew to an altitude of 5,254 feet — just 26 feet short of the 1-mile goal, or 5,280 feet.

**Peer Awards:** Utah State University in Logan clinched its third win for "Best Team Spirit," and Missouri University of Science &



Students from the College of Menominee Nation in Green Bay, Wis., prepare their rocket, the "Gray Wolf," for flight, as launch officials look on. The student team — which included members of five Native American clans — was among 16 teams competing in NASA's 2007-2008 University Student Launch Initiative, the annual rocketeering contest in which students work together to build sophisticated rockets capable of lifting a working science payload to an altitude of 1 mile.

Emmett Given/MSFC

Technology won "Best Looking Rocket." Both awards are selected by all participating teams on launch day.

All prize-winning teams received plaques from ATK Launch Systems and the Marshall Center at an awards banquet following the launch event.

The grand prize — \$5,000 and an invitation to attend an upcoming space shuttle launch — will be awarded in May to the school with the best overall design review, flight performance and final report on their science payload's operations and results. A NASA panel of judges will make the final award not later than May 26.

The University Student Launch Initiative is managed by the Academic Affairs Office in Marshall's Office of Human Capital.

## Marshall awards contract for administrative support services

The Marshall Center has awarded a contract to Deltha-Critique Joint Venture of New Orleans, La., to provide administrative support services for the center. The potential contract value is \$28,982,749 (including all options) and covers the

period of performance from June 1, 2008, to May 31, 2013.

The contractor will provide general administrative duties, record maintenance, desktop processing, TDY support processing, and human

resource automated and transactional processing. Additional support includes paralegal support, court reporting support, temporary management support assistance, and NASA Stars Resume Operations Center support.

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